DATA PROCESSING DIGEST

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General Information

CAN YOU AFFORD THE "PRACTICAL" APPROACH TO ELECTRONICS?

R. R. Ross, Joseph T. Ryerson & Son, Inc., Chicago
MANAGEMENT METHODS, November 1956; pages 36, 37, 56.

The "practical" and the "visionary" ways of approaching electronic data processing are described and contrasted.

The practical approach is aimed at immediate return of benefits such as speedier reports, or a simplification of punched card handling. In such an approach "the basic nature of the input and output remains unchanged; the switch to electronics is free from complication." Justification of the installation must be made on the basis that the equipment will be used for other operations, each of which will be judged independently, "without regard to consolidation of various applications into a single integrated electronic system." Electronic data processing is considered as "an adjunct to present equipment and processes...."

The advantages of the practical approach are: speeds reporting, takes pressure off machine accounting operations, provides data not previously available, involves no large financial risk, provides electronics training for machine accounting personnel, demonstrates the results produced by electronics to management at all levels.

Disadvantages of the practical approach are: it does not really get to the root of management's needs, it is geared to short-term planning, it solves problems in one area while another area is becoming critical, it usually plans for presently available equipment only, ultimate goals are lost sight of.

The visionary approach "is directed at a goal of broader and longer range proportions: effective management control....It involves a penetrating study of data processing requirements within the company ....interpreted in terms of the end reports that provide management control." The study usually reveals a "paperwork assembly line"

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wherein various departments process documents that are summarized in reports. The visionary approach requires consolidation of functions, both within each separate paperwork assembly line and also among the different assembly lines." It requires "a considerable amount of time for investigation of current routines and for the development of the projected new routines. It also assumes...the use of a large scale computer, because it is better to develop an electronic data processing system right in the beginning that has a minimum of machine limitations."

"Visionary" approach offers greater benefits in long-run

Advantages of the visionary approach are that it "encompasses broad objectives for a more scientific control of company operations," it permits management by exception, provides a "thermostatic business control," provides relief from the clerical shortage and the increasing wage rates and fringe benefits. (However, career employees should be upgraded to new jobs that cannot be mechanized, if their jobs are affected by the system.)

Some objections to the visionary approach are that it requires changes in policies and organization, it involves a large outlay of money, and requires several man-years to develop.

"Top management often thinks of electronics solely in terms of office equipment. They find it difficult to view electronics as a business venture. Because a heavy investment in electronics does not produce a salable product, such an investment does not receive the same favorable consideration as does an expensive production machine, for example. Yet the move to electronic data processing is a major decision---and it is not normally practical to move into electronics on a gradual basis, partly because of the expense of parallel operations."

Despite these objections "top management is moving to an inevitable conclusion...that the visionary approach to electronic data processing is not really a question of, 'Can we afford to?' but rather, 'Can we afford not to?'"

A compromise course of action is suggested consisting of "carrying out the planning for the visionary approach, then applying the practical approach as an interim step in putting the long-range system into operation. It is possible to make a long-range survey without actually getting into block-diagramming and development of machine instructions....Even if it is found that the practical approach cannot be included as an interim step in the visionary approach.... through the detailed study, management will have provided itself with a full realization of the risks involved in anything less than a long-range approach to electronics."

(See also: DPD, July 1956, pg 1; DPD December 1956, pgs 3-5.)

THE PHILOSOPHY OF INTEGRATED DATA PROCESSING

Alan O. Mann
SYSTEMS AND PROCEDURES QUARTERLY, November 1956; pages 2-7, 36.

"In industry, data processing is not an end unto itself. Even if data processing were to become more integrated than heretofore, it would still not be an end unto itself. Industry does not manufacture and sell data. It manufactures and sells products. In the process, it develops data which are used in controlling the future of its production and sales activities."

A new concept of IDP in management science

With this statement, the author begins a discussion which raises "integrated data processing" far above its popular conception, and into the realm of management science where it belongs. He points out four faults of present data processing habits: "Our data is not sufficiently timely. It is periodic even though our actual operations are not. We hunt for pennies while thereby expending dollars. Our data is arbitrarily compartmentalized--even though it needs to be unitized to fulfill our company's avowed single purpose of manufacturing and selling its products at a profit."

Before much can be done about remedying these faults, we need to know the true purposes of integrated data processing. "What is it that we are trying to accomplish for the customers, employees, stockholders and management?"

Purposes of IDP

First, "it should be our purpose to change the nature of the work we now require of human beings who handle data for planning and control." We must realize that at all levels, from management on down, "we have built into our operations endless repetitive tedious monotonies of sorting, filing, collating, copying, matching, key punching. These are functions that belong to the tools men can contrive, not to man himself....We have acquired through habit a strong concept of managers' mental functions. We assume a constant use of experience and judgment in their managerial decision-making. In reality, a major portion of their decisions apply to repetitive circumstances and are made with the use of repetitive arithmetic calculations at grammar school level, performed mentally."

The second purpose is the "elimination or reduction of time lags and time lapses" as they occur in our effort to adjust the natural cycles of physical activities.

"Nearly synonymous with the element of time lag and lapse is the element of inaccuracy....Even though the data may be cross-checked down to the last piece or penny of balance, as long as it has application only to a 'then' it cannot be an accurate determinant of 'now.'"

Fourth is the improvement of decision-making at all levels. "We forecast future demand largely through arithmetical calcula-

tions....Yet, because most of our managerial personnel at all levels have not concentrated on training in advanced mathematics, these calculations are usually made with grammar school arithmetic or the simplest elements of algebra. It becomes increasingly apparent...that these present calculations are but a shoddy makeshift....We are discovering that much of our managerial decision-making is a more scientific activity than we have heretofore realized."

The fifth purpose is "the elimination of wastes from our industrial operations." These wastes include "loss of brain-power during unnecessary clerical activities, loss of time before we can take effective action, the wastes that arrive out of inaccuracy, waste floor space used by excessive clerical forces, the wastes of raw material pulled out of our natural resources to sit on shelves and cushion our untimely and inaccurate decisions, similarly created wastes of work-in-process and finished stock inventories, the wastes of paper forms and records...the wastes of our 'boom' or 'bust' cycles of employment and unemployment, want and plenty, prosperity and depression."

The sixth purpose is to bring supply more nearly in line with demand, and the seventh is (as a result of the others) to reduce costs. However, unless we refuse to tackle our problems merely on the basis of immediately reducing costs, "we cannot fully succeed, for what may initially seem the cheapest may ultimately prove to be the most costly. There is no deterrent to industrial progress stronger than a preconceived opinion of costs based on our existing concept of operation."

From these statements, it is concluded that "what we are after is not just integration of data processing, but of administration itself."

Future characteristics of IDP

The author believes that the future of integrated data processing will include these characteristics: "Batch" processing will disappear in favor of "in-line" processing. Random storage with direct, high-speed access will replace sorting and sequential filing. "Programming as and when required out of our massive storage" will replace pre-programming. Departments and functions will be integrated. Communications problems will have to be solved. Punched cards will be eliminated. Computational outputs of exceptions will be substituted for reports and long tabulations. Direct costs will be considered after everything else. Equipment will be designed to suit the desired goals. Five channel punched tape will win out. Individual installations will consist of one make of communications equipment and one make of electronic equipment, rather than many different ones. Concepts of timing and accuracy will be developed which bear no resemblance to those of our past.

"WHAT TO CONSIDER WHEN YOU BUY EDP"

Charles E. Faulkner, Spiegel, Inc.
CONTROL ENGINEERING, November 1956; pages 92-98.

Will it reduce clerical costs?

The main criterion for the purchase of EDP equipment as advocated in this article is cost reduction of clerical operations. Reduction of process time, and more timely management information are viewed as bonus factors. In order to base the feasibility of an EDP installation on the cost reduction criterion, "a completely objective cost analysis" must be made which is "predicated on three bases: complete delineation of objectives, thorough investigation of equipment availabilities, detailed operations analysis."

In defining the objectives, it is necessary to classify the outputs to "determine the required equipment, media, and method." The inputs must be classified in a similar manner "with a view toward automatic handling...and minimum human introduction of data...." Also, the memories or data storage devices "must be surveyed in the light of their purpose, form, cost of maintenance and usability." Minor memories (that is, storage used for plus benefits such as usage forecasting in a stock control system) must also be anticipated and considered in the system requirements.

Compare equipment of all makes

When investigating equipment, it is important to look at the equipment offered by all manufacturers with appropriate products. Comparisons should be made on the following points: internal and external memory capacities; access time to memories; forms of external memory; commands available; input and output forms; output printing speed; effective productive computer time; maintenance, space, air-conditioning, and operating personnel requirements; number of units presently operating successfully.

An analysis of present operations should be made, and proposals prepared for the various machines being considered. These proposals should be evaluated with respect to proposed equipment and proposed processes. "This evaluation must include adaptability to the present methods and facilities....The entire operating structure of an organization need not and should not require complete change to obtain the anticipated savings."

After some of the proposals are selected as the most possible, complete process flow charts should be developed for the system outlined in each. "To be effective, the process charts must be detailed enough to reveal every element of process cost." A typical chart is shown which indicates required personnel time, equipment, supplies, and media. From this chart, the following data can be derived: personnel requirements, required subsidiary equipment, revamping of physical facilities, operating supplies and forms, process time. It is desirable to determine the data-processor running time by partially programming each data-processor for the specific operations under consideration.

Compare costs of present and proposed systems

Following these evaluations, detailed costing of the present and proposed operations is made in the areas of labor cost, form and supply costs, and rentals. "After the detail costs are computed and summarized, the operating savings can be determined by comparing systems and equipment with the cost of the present system. Certain collateral savings can then be developed and added to the total annual savings to obtain the gross operating savings; for example, reductions in social security and unemployment premium payment, etc."

The annual cost of the capital investment and equipment maintenance is deducted from the gross operating savings for each proposal. Then an amortization period (usually "shorter than that used for standard office equipment because of obsolescence and reliability factors") is selected. "After selecting the amortization period, the annual cost of the basic and subsidiary capital investments can be determined. Coupled to this must be the annual maintenance cost...."

In analyzing present costs, capital equipment and maintenance should be included if rented equipment is being replaced, but not included if owned capital equipment cannot bring a "respectable disposal price."

Net savings can now be figured on the basis of net annual savings for a reasonable period longer than amortization.

Final evaluation of the proposals must include consideration of advantages other than cost reduction, and the reputation of the manufacturers under consideration.

SPECIAL REPORT: CAN WE GET BETTER AIR TRAFFIC CONTROL?

AVIATION AGE, December 1956, beginning page 174.

((The design of an effective Air Traffic Control System--ATC--is one of the most important data processing problems facing the nation today. This series of articles is an excellent review of the present ATC situation.))

Why We Have an ATC Problem

Although the need for an integrated, automatic ATC was pointed out by technical groups in 1948, little has been done because of financial, administrative and technical reasons.

Financially, the Commerce Department, Budget Bureau and the Congress have never given CAA the funds necessary for R & D or for system implementation.

Present administrative machinery is out-of-date

Administratively, "the picture is darkest," because "the machinery set up by the government to handle ATC matters has been outmoded by changing concepts of air space use."

There are a number of groups responsible for the control of air space, in particular the military and the Civil Aeronautics Authority. Administration is by committees.

"These committees and boards have no true authority--for they lack the power of enforcing their decisions....

It's customary in these committees to consult the users to see how they think the ATC system should work. Seldom, however, do all the users--the military, the airlines, business pilots, and private pilots--agree....

This is the technical problem: ATC equipment and techniques have all too often been chosen in the complete absence of any clear-cut decisions on just what the ATC system was supposed to do.

Decisions are needed, not only about the way the system should work--the philosophy of control--but also about the tolerances, or parameters, it should work within."

What Type of System Do We Want?

The system decisions to be made are these:

Four criteria for a system

- Will there be one system or two (civilian and military)?

  "...The military will not have the ability to identify an intruder until all civil and military aircraft are under positive surveillance. That is, the aircraft must be known to, identified, and tracked by a ground authority."

- How much equipment will be required in the plane?

  "The equipment you install on the ground is, in effect, a slave to the equipment you put in the airplace....We cannot build an improved system--one that uses machines as well as men--unless we narrow flexibility in airborne equipment."

- What is the role of machines?

  "An analysis of the work done by controllers today shows that they spend far too much time on purely clerical chores....

  These clerical duties take up so much of the controller's

time that they limit his capacity to control traffic. So automation of these jobs will be a big factor in increasing the system's capacity....

...it's possible for a machine to search out potential conflicts and bring them to the controller's attention. It can even suggest what the controller should do to resolve the conflict."

- "The fourth basic issue involves the relationship between interim improvements and a long range plan for better traffic control. There's always a temptation to concentrate on steps that will bring immediate relief and wait till later to find out how they fit in with the long range plan.

  We've yielded to this temptation in the past, and we're in danger of yielding to it now in the wake of the Grand Canyon crash....

  What's needed is a long range goal and a clear-cut way of building towards it. There must be a bridge between the system in use today and that blueprinted for tomorrow. The only interim steps that are worth while are those that help us cross the bridge into the future."

((This last is good advice for any system.))

Principles of ATC

The operating principles to be selected include these choices:

- Will all deviations from flight plans require permission; or will the system automatically account for deviations?

- Should random flights be allowed, or should all flights be channeled into standard routes?

  "Probably the system...will...be based on channeled routing, but have the capacity to provide random routing for users who really need it."

- "Closely related to the routing problem is the question of segregating aircraft according to speed....Where traffic density warrants it, segregation of aircraft on parallel routes by speed category is effective in speeding up the traffic flow. To make this possible, however, a navigation system with certain inherent characteristics is needed. That's why a decision for or against this technique must be part of our ATC planning."

- How can flow be controlled?

"There are three ways aircraft can adjust to an ATC delay. Some--especially the jets--can delay on the ground before departure. Others can stretch out their route or slow down in flight. Still others can be held in a stack near the airport."

Tools of ATC

The basic tools of ATC are (1) navigation systems (2) communication systems (3) data handling equipment and (4) airport facilities.

The future ATC system might involve a data system like this:

Automatic communicating

"The more fully equipped aircraft would have 'black boxes' that would automatically transmit position and altitude (and possibly other details such as heading and airspeed) to the ground. This information would be fed into the controller's data storage and data display equipment.

Messages sent from ground to air--such as clearances--would travel automatically to the pilot and be displayed in the cockpit....

All this information would travel as coded impulses. These permit a much higher rate of data transfer than does voice communications and lead to far fewer errors....

Data handling today is all manual. Information collected by phone, radio, or (rarely) teletype is written out on flight progress strips that also serve as data display....ETAs are calculated with the old and reliable--but manual--E6B computer. Controllers and pilots exchange information by voice. Automation of all these data handling processes is long overdue....

One expert suggests the key to the whole data handling problem is the choice of a display technique....for the controller....needs a dynamic display--showing where the planes are going as well as where they are....

Two steps are vitally important to overcome the controller's natural hesitation [in using automated systems]. One is the need for human engineering of the machinery to be used by him. The information he gets from the machine should be in the form in which he can most easily absorb and use it. He also should have full assurance that he can take over smoothly and safely should the machine fail.... The second step is to build a bridge from the present manual ATC system to a future fully automatic one. Give the controller mechanization in small doses...."

Equipment Outlook for ATC

Radar, navigation system, communication equipment, and computers all are involved in ATC. About data processing in particular: "Magnetic drums and electronic computers are already available for data storage and data processing. The problem is to decide on how to use it.

One of the most promising ideas is a system that uses punched cards and a computer. It can be made to print, as well as punch, flight plans and other data. This is an important "bridge" from our present manual system to an automatic one. The controller can handle it easily and build up his confidence in automation in ATC." ((This still does not solve the long-range problem, which would use something more automatic than punched cards, it is hoped.))

Needed for Better ATC: A Bold New Approach

"The logical solution is to set up an ATC authority that is independent of both Commerce and Defense Departments.... This agency must have the authority to resolve civil-military conflicts--and to make its decisions stick.... There must be a pooling of talent...[and]The independent ATC authority must have true financial support....

A master plan for the future

Unquestionably, the first task of such an authority would be to draw up a master plan for ATC. This plan must evolve logically--principles must be decided before methods are discussed, and agreement on methods must precede any discussion about hardware.

Also, the plan must use the systems engineering concept. Each part of the system must be considered in its relation to the system as a whole."

Comment:

Three additional comments are worth considering in relation to an integrated ATC system.

1. As part of the system design basic considerations can be attacked mathematically: what should be the sampling ratio of the system (how frequently should the controller, i.e., the executive, receive reports)? Military experience with the SAGE and other systems should be valuable.

2. To build a system reliable enough to protect the flying public is a real challenge to engineers. With a fully automatic system, the volume of flights will be so high that, in the event of a failure, a human controller

could not hope to "take over." The system should be designed so that it never fails! (Although components might.)

3. Note that the system must cope with deviations (due to weather, failures, etc.) just as businessmen must cope with "exceptions."

If and when an automatic ATC system is developed it will be of interest to us all. Related industries (trucking, railroads, auto-traffic control) will find many developments which apply to their problems. EDP users will gain from better, more reliable computing, communication, and display equipment.

In any case, we should be able to prevent any future Grand Canyon crashes.

ADMINISTRATIVE DATA PLANNING—A PREREQUISITE OF DATA PROCESSING

R. M. Waddell, E. I. du Pont de Nemours & Company
Paper presented at Institute of Management Sciences Meeting, October, 1956.

Traditional accounting reports do not show cause and effect, therefore are not useful in forecasting performance of economic factors which contribute to the rise or fall of profit. For example, productivity of labor is not found in an accounting report. Seven steps are given for constructing a practical Administrative Data Plan.

Traditional accounting reports are inadequate

1. Design a data framework, classifying by topic and detail each item of data, define each item, then train administrators to understand and use the plan. (Typical inputs are: labor, manhours, labor costs, materials; typical outputs: parts fabricated, drawings, dividend checks.) The inputs are related to outputs by "Cost per Unit Produced."

2. Select the data to be reported.

3. Decide how frequently any one group of data should be reported.

4. Decide who should receive the report.

5. Design the reporting media according to the data's long range or short range purposes.

6. Select the equipment best suited to process the planned data.

7. Evaluate cost of processing each bit of information, striking out of the plan those bits which do not pay their way.

APPLICATION OF DATA-PROCESSING EQUIPMENT IN THE OFFICE

E. C. R. Williams, and D. J. Bailey
THE ACCOUNTANT, November 3, 1956; pages 455-560

The real meat of this article is indicated in the sub-title: "Some internal audit implications." After a few paragraphs on the characteristics of electronic data processing of business records, the place of the internal auditor in the new set-up is examined. Control of clerical error or fraud is more difficult in an electronic system because of the impossibility of checking on the intermediate steps in processing which are being handled wholly by the equipment itself. It follows that the internal auditor must exercise greater control during the input and the output stages. This would include: control of the accuracy and recording of initial data and of its summarizing and reproduction; firmly laid down procedures which incorporate the necessary checks; and analysis of results and costs, and review of the trends revealed.

It is the responsibility of the internal auditor to ensure that the program is properly prepared and used, that the main records are kept accurate (whether they be on magnetic tape or punched cards), that new data conform with the initial authorized forms, and that program, records and data once fed into and stored within the equipment are not falsified by manual intervention in any way.

ELECTRONIC COMPUTERS AND DATA PROCESSING

H. J. Crawley, National Research Development Corp. (England)

SOME EFFECTS OF DATA PROCESSING ON ACCOUNTING

B. C. Lemke, Michigan State University
THE ACCOUNTANT, November 3, 1956.

These two round out the EDP features in this particular issue of THE ACCOUNTANT. The first article is a resume of the development of the electronic computer, along with a good description of a computer's characteristics, limitations, and advantages. The second article examines the accounting function as it is likely to be affected by electronic equipment. Among these is a need for reports which are a more timely and accurate picture of a business at any given moment, and a breakdown of the traditional departmentalization of businesses.

THE TECHNICAL FEASIBILITY OF TRANSLATING LANGUAGES BY MACHINES

V. H. Yngve, M.I.T., Cambridge, Massachusetts
ELECTRICAL ENGINEERING, November 1956; pages 994-999.

Word-by-word translation is within our immediate reach, but the quality of the translation is quite crude. Sentence-by-sentence

translation would produce translation of high quality, but requires a great deal of research into the structure of languages. Persons who are interested in the work being done by the Massachusetts Institute of Technology in mechanical translation will find this article of value.

PREVIEWING FUTURE OFFICE-PLANT AUTOMATION

AMERICAN BUSINESS, November 1956; page 40.

"Functional integration" is the goal of office automation at General Electric. This is visualized as an electronic system that begins with the customer's order and extends through the transmission of information to the manufacturing plant, the district office, the warehouse and the customer. In the factory, another system would maintain inventory information and schedule the manufacturing steps.

END OF AN ERA

Theodore R. Pleim, Lybrand, Ross Bros. & Montgomery, New York
SYSTEMS, September-October, 1956; pages 13, 14.

The trend is toward justification of computer systems by reason of the improvement in profits that may be obtained when management receives more timely information.

Other trends are: toward medium and small size computers for smaller organizations; development of large capacity random access memory systems; integration of the functions of a business; development of data processing centers as service bureaus within a company; better utilization of the abilities of people through use of computing systems.

THE ACCOUNTANT'S ROLE IN OPERATIONS RESEARCH

Bernard Whitney, Whitney & Kornfeld, Los Angeles
JOURNAL OF MACHINE ACCOUNTING, December 1956; pages 12-14, 30.

The accountant is advised to begin applying OR techniques to his work in order to provide management with more timely and useful reports. The accountant also has the responsibility for supplying the OR team with the information it needs to make its studies. CPA's can find a broadening of their field by providing OR services to smaller organizations.

TOMORROW'S OFFICE AUTOMATION TODAY

J. H. Harvey, Standard Register Co. (Moline, Ill.)
JOURNAL OF MACHINE ACCOUNTING, December 1956; pages 4-6, 26, 27, 30.

The machine accountant is in a good position to understand and interpret the advantages of IDP to management. Hence, he should take the lead in studying procedures and the end results to improve reports to management.

THE ELECTRONIC OFFICE

R. H. Williams, A.I.B.
Published by Gee and Company Ltd., England

It is difficult for an American reviewer to evaluate properly a book written about the status of the electronic office in England. Moreover, much of the material in this small volume is undoubtedly outdated, since it was written in June 1955. We can, therefore, judge it only on the basis of its organization and clarity of subject presentation. It contains ten chapters which attempt to explain the technical operation and design theory of computers, as well as describe commercial applications such as payroll and accounts receivable. Such a broad view of this complex subject cannot be covered adequately in the 63 pages the author has allotted himself. This probably accounts for the feeling of disorientation which the reader has as he progresses through the book. Although directed toward the newcomer to the field, it is doubtful if the book could help him toward further study, especially in view of the lack of a bibliography or reference list. Judging by the information about American computers, considerable updating of equipment information is needed, and we hope that future editions will include such data. A clear picture of the status of commercial electronics in England would be of interest to America and the United Kingdom alike. (Price: 15/6 or approx. $2.17)

Equipment

DOCUMENT PROCESSOR READS CODED DOTS

Raymond L. Fortune, Standard Register Co., Dayton, Ohio
ELECTRONICS, December 1956; pages 164-168.

A technical description is given of the Stanomatic system which operates from coded information preprinted with special ink, ribbon

or carbon paper on source documents. The coded information is in the form of dots in combinations of 30 columns, five dots per column. The coded information is printed on the source documents by special encoders or coding attachments to standard electric typewriters.

NEW MECHANICAL TAPE-PUNCHING UNIT

OFFICE MANAGEMENT, November 1956; page 56.

The Typatape is a mechanical paper tape punching unit which can be attached to any standard adding, accounting, bookkeeping, or billing machine, or cash register. It works on power which is supplied by the gears of the machine to which it is attached, hence, is not dependent upon electrical power. It is simple enough to be repaired by any competent machine technician. Cost is about $900. A tape-to-card converter will cost about $5,000.

(See DPD: December 1956, page 12; "Helping hand for the data processor.")

Applications

MEDIUM-SIZE COMPUTERS MAKE NEW GAINS

CHEMICAL WEEK, November 10, 1956; pages 62, 64.

Du Pont, Dow, Olin Mathieson and other chemical companies have found that the medium size computers are doing a good job in research problems and in preparing problems for larger computers.

SAVINGS AND LOAN FIRM BRINGS AUTOMATION TO THE SMALL OFFICE

Richard Neumaier, Systems consultant, Philadelphia
THE OFFICE, November 1956; pages 69-77.

An automatic bookkeeping system for processing mortgage payments was designed for the Penn Federal Savings and Loan Association of Philadelphia, using the IBM Cardatype. The system will be able to handle up to 6000 mortgage accounts at a cost of less than $11,000 a year, including rental, tax and personnel.

Comment

SELECTION OF PROGRAMMING PERSONNEL

There is unfortunately little proof of the value of any particular method for selecting programming personnel for an EDP installation. A number of groups are using tests, however, and these will be discussed briefly below.

The tests need to be tested

The major difficulty in developing a good selection test is in testing the test itself. Ideally, a large number of people would be selected at random; they would be given a selection test; they would be trained and then allowed to program for, say, six months. At the end of this time, the correlation between the tests and the final ability to program would be measured. In every actual case, however, those who do not pass the selection or the training program are not permitted to go further (because of economic reasons). Thus we are not sure that the test rejects poor prospects properly, nor are we sure that the test is not rejecting promising prospects.

It should also be noted that there is some indication that the tests described below do not correlate well with the performances of the applicants in the training program; but do correlate well with ultimate ability to program. (See DPD May 1956, page 2, "The Human Side of Electronics" by W. S. Bagby.)

Almost every installation gives the applicants one test intended to measure ability to reason logically. Such tests are:

1. Aptitude Test for EDP Programmers, available from IBM.

2. SRA Primary Mental Abilities Test (Science Research Associates, 57 West Grand Avenue, Chicago 10, Ill.) The verbal meaning, space ability, and reasoning sections of this test have been found most useful.

Some installations have discussed using a personality or temperament test. Section E of the Thurstone Temperament Schedule (Sciences Reasearch Associates) has been used but there is no evidence of correlation with ultimate ability of programmers.

Correlation is found between programming ability and tests

Recently a small group of programmers who originally were selected at random were tested using a number of tests. These men had been programming for at least three months. A strong correlation has been found between the following tests and the ability to program as evaluated by the chief programmer (who has been doing this sort of work for many years).

1. Part II of the Aptitude Test for EDP Programmers mentioned above.

2. Comprehension of Printed Material Test.

   This test was developed specifically by the County of Los Angeles Civil Service Commission and is not generally available. It is a test in which the applicant must read a paragraph and isolate "the word or phrase [which] is incorrect because it confuses or distorts the ideas expressed by the paragraph as a whole."

3. Technical Abilities Test for EDP Programmers and Systems Analysts (developed by Canning, Sisson and Associates).

   This test was designed to measure the applicant's existing knowledge of clerical and data processing procedures. (If sufficient interest is shown in this test, it will be made available.) These tests are listed only as a matter of interest; no claim is made for their validity.

It is hoped that the above comments will be a guide to companies now facing the problem of selecting programming personnel from among their existing employees or from outside. It is unfortunate that no group has been able to completely test a selection method with a large sample of people. We would be pleased to receive and publish data gathered by various companies on the correlation between selection tests and ultimate ability to program.

THE CHANGING PATTERNS OF EDP

It must be confusing to the person beginning to investigate electronics for his company to read the great variety of opinions on this subject. But if one has the time, or if one is merely an interested bystander, he can begin to see some patterns emerging from the mass of material. The patterns change, and the changes form a trend. As an interested bystander, DATA PROCESSING DIGEST has observed some of these changing patterns during its year and nine months of existence.

Feasibility study pattern

Early in 1955, most companies were preoccupied with the hardware. Experienced pioneers wrote articles admonishing dazzled executives to plan first, then purchase. The pattern for the feasibility study was developing, through the excellent reporting of Price Waterhouse, Consolidated Edison, Sylvania, C.I.T. Financial Corporation,

and others. Although some of these pioneers were envisioning electronics as a completely new tool for better management of the business, the great majority of those beginning to plan for electronics were merely transferring their present systems to the faster electronic equipment. Electronics was being viewed primarily as a cure for current ills ("The study of the application of electronics should be undertaken in relation to definite problems existing in the individual company."). In other words, electronic data processing was problem-oriented.

During the summer and fall months in 1955, many people became enamored of integrated data processing, and the popularity of the catch-name IDP led some to believe that the automatic office meant the recording of documents on punched paper tape at the source and automatic transcription of information from office to plant to warehouse.

Common language concept

While the IDP "common language" concept helped point up the need for solving the communication problem, it sometimes clouded the greater need for management control, and undoubtedly lulled some businessmen into a false sense of security about their speeded up paperwork system.

However, a few pioneers were pleading for a larger view of electronics in business. As we said in "Comment" in August 1955, "the field of data processing is becoming increasingly hard to define." DPD was beginning to include articles on management decision-making techniques and systems engineering. Curiously, however, although computers were being considered a valuable tool in decision-making, much important information for management was being obtained merely as a by-product of the speeded-up accounting procedures. Thus, EDP was transaction-oriented with the emphasis on alleviating the bottlenecks in traditional business methods.

A discerning comment was made in an article reviewed in DPD November 1955 by Melvin L. Hurni about the confusion: "...we have entered an era in which competition for concepts about the basic nature and structure of a business is coming to be as real as competition in the market...." He considered it important to see that automation has its roots in "the logic of an over-all system of operation," which includes marketing, manufacturing and engineering design. ("Decision making in the Age of Automation," pg. 1.)

Business as a control system

There was developing a concept of a business organism as a control system, which could be engineered. This was brought out in the article, "Business Systems Can be Engineered," reviewed in DPD February 1956 on page 4, and in "An Engineer's Approach to Office Systems," in the same issue, page 11.

By spring, 1956, reports on apparently successful installations were appearing, with the emphasis on personnel problems created by the electronic system. Operations research was becoming a common topic of conversation among businessmen. Systems design and systems analysis were new phrases in the confused definition department.

Breaking with tradition

During the summer managers and accountants began to realize the impact electronics was about to have on traditional accounting methods. Articles such as "Electronic data processing and the controller," in DPD June 1956, page 2, and "'The Practical' vs. the 'Visionary' Approach to Electronic Data Processing," in July 1956, page 1, pointed out that the purposes and the goals of the business were the determinants of an information system, and that nothing which failed to contribute to the goals should be allowed to remain in the system. General E. W. Rawlings viewed electronics as "a break with the past which involves changes of familiar patterns, the irritant of adjustment to something new." ("The Responsibilities of Management by Electronics," DPD September 1956, page 1.) In the same vein, V. Donald Schoeller says automation as an extension of scientific management "is based on an over-all managerial cooperation rather than on individual projects aimed at solving problems of the moment..." ("Is Gobbledygook Shrouding Automation Techniques?" DPD November 1956, page 1).

Thus the emphasis on sound business system planning, based on a clear definition of company goals, rather than preconceived or time-honored departmentalizations and methods, seems to be the new dominant note. Electronic data processing is becoming goal-oriented.

NEW IDEA IN PROGRAMS

N.A.C.A.

The San Diego Chapter of N.A.C.A. has published the transcript of its program for 1955-56. What makes this program and publication unique is that the entire year's programs for the organization were conceived as an integrated series of lectures on "Mechanized Accounting," each lecture being an essential part of the subject. Thus, for full understanding of the subject, a member needed to attend all nine meetings. The speakers were all well known in the EDP and systems field. Copies of the transcript have been made available to other N.A.C.A. chapters. A few copies will be available on a first come first serve basis after February 1. For information on the course and the transcript write to Rolfe Wyer, President, San Diego Chapter, N.A.C.A. at Solar Aircraft Company, 2200 Pacific Highway, San Diego 12, California.

IN MEMORIAM

We regret the death of Bruno A. Chiappinelli, Executive Associate with Canning, Sisson and Associates, on December 20, 1956, after a short illness.

References

The addresses of publishers and periodicals mentioned in this issue of Data Processing Digest are listed below for your convenience in obtaining further information about the articles or books listed.

The Accountant
4 Drapers' Gardens
Throgmorton Avenue
London EC2, England

American Business
4660 Ravenswood
Chicago 40, Illinois

Chemical Week
330 West 42nd Street
New York 36, New York

Electrical Engineering
33 West 39th Street
New York 18, New York

Electronics
330 West 42nd Street
New York 36, New York

Gee and Company Ltd.
27-28 Basinghall Street
London EC2, England

Journal of Machine Accounting
53 West Jackson Boulevard
Chicago 4, Illinois

Management Methods
22 West Putnam Avenue
Greenwich, Connecticut

The Office
232 Madison Avenue
New York 16, New York

Office Management
212 Fifth Avenue
New York 10, New York

Systems and Procedures Quarterly
Box 281 Wall Street Station
New York, New York

Systems
315 Fourth Avenue
New York 10, New York

CORRECTION

In the December 1956 issue of DATA PROCESSING DIGEST the following material was omitted from "Comment" following the last line on page 15:

> This involves the ability to organize the computer steps in a logical manner, which will conserve computer time. It involves a detail knowledge of the computer and its operation, of programming rules and of the standard programs available.
>
> 2. Supervise the technical work of one to three coders, and other programmers.

On page 10 of the same issue, in the article titled "Electronic Aids for Management: How to Shop," the first word in the sixth line should read "uninformed."

See DPD September 1956 for list of more than seventy periodicals regularly reviewed for significant information in the data processing and related fields.

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Training

Engineering and Management Course, University of California at Los Angeles

Date: January 21-31, 1957
Place: Los Angeles, California
For whom: Engineers and managers, all levels
Subjects: 25 subjects covering operations research, electronic data processing, management decision-making, industrial engineering, etc.
Cost: $350

Information: Edward P. Coleman, Coordinator, Engineering and Management Course, College of Engineering, University of California, Los Angeles 24, California

"Management Concepts in Operations Research"

Date: January 28 - February 1, 1957
Place: Boston, Mass. (Sponsored by The Harvey N. Shycon Company, Management Consultants)
Program: Lectures and workshop led by six members of the staff of the Massachusetts Institute of Technology. The course is designed for upper and middle management and for those preparing for executive responsibility. It will require some knowledge of basic mathematics.
Fee: $225.00 (includes text, class materials, notes and the course banquet). The course will be held at the Harvard Club of Boston. Accomodations for male participants are available at the Club.
Information: The Harvey N. Shycon Company, Park Square Building, Boston, Mass.

General Management Conference, sponsored by AMA

Date: January 29-31, 1957
Place: Los Angeles, California (Statler Hotel)
Information: American Management Association, 1515 Broadway, Times Square, New York 36, New York

"Operations Research in the Planning of Computer and Data Processing Systems"

Date: January 30, 31, February 1, 1957
Place: Case Institute of Technology, Cleveland, Ohio
Registration: Limited to 200
Information: W. W. Abendroth, O. R. Group, Engineering Admin. Dept., Case Institute of Technology, 10900 Euclid Avenue, Cleveland 6, Ohio.

Design of Data Processing Systems (Course #X467AB)

Date: February 6 through April 24, 1957
Place: University Extension, University of California at Los Angeles
Information: Write to above department at UCLA, Los Angeles 24, California

Special Seminar Program, Western Reserve University School of Library Science

Date: February 4-8, 1957
Place: Cleveland, Ohio
Subjects: Documentation survey, Machine aids to librarianship, Special libraries
Information: Jesse H. Shera, Dean, School of Library Science, Western Reserve University, Cleveland 6, Ohio

Seminars in operations research presented by Operations Research Institute

Date: One seminar each month through June, 1957
Subjects: Inventory and production management, Linear programming, Forecasting and budgeting.
Information: Operations Research Institute, Inc., 41 Fifth Avenue, New York 3, New York.

Meetings

"Automatic Coding" Symposium

Date: January 24, 25, 1957
Place: The Franklin Institute, Philadelphia 2, Penn.
Topics: An Automatic Coding System for the IBM 705, Automatic Coding Experience at the General Electric Company's UNIVAC Installation in Louisville, Ky., Debugging Automatic Coding, Omnicode, A Common Language Programming System, A Mathematical Language Compiler, The Procedure Translator, A System of Automatic Programming, A Mechanized Approach to Automatic Coding, and A Matrix Compiler for UNIVAC.
Registration: Limited. $35.00 (including all sessions, UNIVAC demonstration, two luncheons, dinner, proceedings.)
Information: Automatic Coding Symposium, Franklin Institute, 20th and Parkway, Philadelphia 3, Pennsylvania.

Ninth Annual Industrial Engineering Institute

Date: February 1, 2, 1957
Place: University of California Extension, simultaneous sessions in Berkeley and Los Angeles.
Purpose: "To present to industrial engineers and managers the latest developments in research and practice in these fields. The content of the papers will be of interest to line and staff personnel in companies both large and small. Additionally, a seminar providing detailed discussion of Automatic Data Processing is included for advanced participants."
Registration: Limited to 40 for Seminar on Automatic Data Processing. Unlimited for other 10 sessions. Fee: $20.00 (includes all sessions, two luncheons, copy of proceedings).
Information: Department of Conferences and Special Activities, University Extension, University of California, Berkeley 4 or Los Angeles 24, California.

Third Annual Electronics Conference, sponsored by AMA

Date: February 25-27, 1957
Place: New York City (Statler Hotel)
For whom: Management personnel
Information: American Management Association,
1515 Broadway, Times Square, New York 36, N. Y.

Orientation Seminars on EDP and IDP, sponsored by AMA

Dates: March 27-29, April 10-12, May 13-15, June 17-19
Place: New York City (Sheraton-Astor Hotel)
Fee: $150 (AMA members) $175 (non members)
Information: American Management Association,
1515 Broadway, Times Square, New York 36, N. Y.

Western Joint Computer Conference *

Date: February 26-28, 1957
Place: Los Angeles, California (Statler Hotel)
Theme: "Techniques for Reliability"
Information: S. D. Wanlass, Systems Research Corp.,
13729 Victory Blvd., Van Nuys, California

Third Annual High-Speed Computer Conference

Date: March 5-8, 1957
Place: Baton Rouge, Louisiana
Information: Dr. Leon Megginson, College of Commerce,
Louisiana State University, Baton Rouge, Louisiana

International Conference and Exposition sponsored by NOMA.

Date: May 12-16, 1957
Place: Los Angeles, California
Information: National Office Management Association,
132 West Chelten Avenue, Philadelphia 44, Pa.

International Conference on Operational Research, sponsored by Operational Research Society, Operations Research Society of America, The Institute of Management Sciences.

Date: September 2-6, 1957
Place: University of Oxford, England
Subjects: The common themes in operational research, methodology, applications

*On Friday, March 1, 1957, following the WJCC, the Los Angeles Chapter of the ACM will hold a symposium entitled "New Computers--A Report from the Manufacturers." No registration fee is required. The symposium will be held in the Golden State Room at the Statler Hotel. It is designed to present an opportunity for the manufacturers to discuss the technical details of new computer systems. The program is restricted to general-purpose, large-scale systems for scientific and business applications. Only the newest equipment will be discussed. Companies and equipment represented are: NCR 304, ElectroData's Cardatron and Datafile, DATAmatic 1000, RCA BIZMAC II, UNIVAC Scientific Computer Systems, IBM STRETCH Computer, Philco S-2000, Logistics Research 800. For further information about the symposium, write to: Walter F. Bauer, Computer Systems Division, Ramo-Wooldridge Corporation, P.O. Box 45067 Airport Station, Los Angeles 45, California.